

WHAT IS CLAIMED IS:

1. A tetraode field emission display, comprising:
an anode plate, including a phosphor layer formed thereon;
a cathode plate, including an electron emission source layer aligned with the
5 phosphor layer;
a mesh, including a gate layer facing the electron emission source, a
converging electrode plate facing the phosphor layer, an insulation layer sandwiched
between the gate layer and the converging electrode layer, and a plurality of
apertures extending therethrough; and
10 a plurality of spacers installed between the anode plate and the converging
electrode plate for insulation and separation in a predetermined distance.
2. The display of Claim 1, further comprising an isolation wall or a spacer
extending between the gate layer and the cathode plate.
3. The display of Claim 2, wherein the isolation wall is configured between
15 the apertures.
4. The display of Claim 1, wherein the mesh further comprises an invalid
region along a periphery of the converging electrode layer, and the invalid region
includes a plurality of markings for alignment.
5. The display of Claim 1, wherein the apertures have inverse conical
20 shapes.
6. The display of Claim 5, wherein the apertures opening at the gate layer
with a gauge larger than a diagonal length of the electron emission source layer.
7. The display of Claim 1, wherein the apertures have sandglass shapes.
8. The display of Claim 7, wherein the apertures opening at the gate layer
25 with a gauge larger than a diagonal length of the electron emission source layer.
9. The display of Claim 1, wherein the converging electrode layer has a
potential lower than that of a drain potential applied to the gate layer.

10. A method of forming a tetraode field display, comprising:
forming an anode plate having a phosphor layer thereon; and
forming a cathode plate having an electron emission source layer thereon; and
forming a mesh and disposing the mesh between the anode plate and the
5 cathode plate, wherein the mesh includes a gate layer facing the cathode plate and a
converging electrode plate facing the anode plate.

11. The method of Claim 10, further comprising a step of forming an
insulation layer sandwiched between the gate layer and the converging electrode
layer.

10 12. The method of Claim 10, wherein the step of forming the mesh
comprises:
fabricating the converging electrode plate from a metal conductive material;
forming an insulation layer on the converging electrode plate; and
forming the gate layer from a conductive material on the insulation layer.

15 13. The method of Claim 12, further comprising a step of forming a plurality
of apertures extending through the mesh.

14. The method of Claim 12, wherein the metal conductive material has a
thermal coefficient substantially the same as that of the anode plate and the cathode
plate.

20 15. The method of Claim 12, wherein the metal conductive material includes
a composite plate of iron, nickel and carbon.

16. The method of Claim 12, wherein the step of forming the insulation layer
includes a printing or a photolithography patterning process.

25 17. The method of Claim 12, wherein the step of forming the gate layer
includes printing, sputtering, evaporation plating or photolithography patterning
process.

18. A mesh used for a tetraode field emission display, wherein the mesh is installed between an anode and a cathode of the display, and the mesh includes:

a converging electrode plate facing the anode; and

a gate layer facing the cathode plate.

5 19. The mesh of Claim 18, further comprising an insulation layer sandwiched between the converging electrode plate and the gate layer.

20. The mesh of Claim 18, wherein the mesh includes at least one aperture allowing electrons emitted from the cathode to project towards the anode.

10 21. The mesh of Claim 20, wherein the converging electrode plate is fabricated from a metal conductive material with a thermal expansion coefficient substantially the same as that of the anode and the cathode.

22. The mesh of Claim 20, wherein the converging electrode plate is fabricated from a composite plate of iron, nickel and carbon.